Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Dependence of enhanced asymmetry-induced transport on collision frequency[1] D.L. EGGLESTON, Occidental College — Our previous studies[2] of asymmetry-induced radial transport using a single-particle code with collisional effects have identified, for asymmetries of the form $\phi_1(r)\cos(kz)\cos(\omega t - l\theta)$, two sources for the transport: resonant particles (RPs) and axially trapped particles (ATPs). We observe that this latter type, which occurs near the radius where ω matches the azimuthal rotation frequency ω_R, is often dominant at low collision frequency ν but becomes negligible at higher ν. This can be understood by noting that ATPs have a lower trapping frequency $\omega_T^2 = (l^2\phi_1/rB)|d\omega_R/dr|$ than RPs. In the low ν (banana) regime, the radial oscillations have amplitude $\Delta r = v_r/\omega_T$, so ATPs dominate, and the transport may even exceed the RP plateau regime level. As ν increases, collisions start to interrupt the slower ATP oscillations while the RPs are still in the banana regime, so the ATP contribution to the transport decreases. At the largest ν values, ATP transport is negligible and the observed diffusion coefficient matches that given by plateau regime RP theory.[3]

[1]Supported by U.S. Department of Energy grant DE-FG02-06ER54882 and National Science Foundation grant PHY-1003952.
[2]D. L. Eggleston, Phys. Plasmas **19**, 042307 (2012).
[3]D. L. Eggleston and T. M. O'Neil, Phys. Plasmas **6**, 2699 (1999).

Dennis Eggleston
Occidental College

Date submitted: 11 Jul 2012 Electronic form version 1.4